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THE GEOLOGIC REMOTE SENSING FIELD EXPERIMENT (GRSFE)

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Approximately 40 scientists from eight universities and three NASA centers participated in the Geologic Remote Sensing Field Experiment (GRSFE), which was co-sponsored by the NASA Planetary Geology and Geophysics Program and the NASA Geology Program. The GRSFE airborne campaign included data acquisition by several airborne instruments within a period of a few months, including the Airborne Visible and Infrared Imaging Spectrometer (AVIRIS; collected September 28, 29 and October 4, 1989), Thermal Infrared Multispectral Scanner (TIMS; collected July 17 and September 27 and 29, 1989), Advanced Solid-State Array Spectroradiometer (ASAS; July 17, 1989), and Polarimetric Synthetic Aperture Radar (AIRSAR; September 13 and 14, 1989). The sites covered were Lunar Crater Volcanic Field in Nevada, and a number of sites in the Mojave Desert of California. Table I contains a summary of the data acquired.

Field measurements were done at the time of the flights and were concentrated in the Lunar Lake area. They included measurements for characterizing the atmosphere using a weather station, wind speed towers, measurements using the Portable Apparatus for Rapid Acquisition of Bidirectional Observations of the Land and Atmosphere (PARABOLA), a spectral hygrometer, and a Reagan radiometer. Visible/near-infrared measurements were made using the Single Beam Visible/Infrared Intelligent Spectroradiometer (SIRIS), and a Daedalus Spectrafax AA440 field spectrometer. Thermal spectral radiance measurements were made with the Portable Field Emission Spectrometer (PFES). Surface temperatures were measured using a Raynger Raytek II Plus and arrays buried of thermistors. To assist in the calibration of the radar data, corner reflectors were deployed. Stereo photography (from a helicopter) was acquired, and topographic profiles were constructed. Field differential Geopositional Satellite (GPS) microterrain survey techniques were also used to extract topographic profiles.

The GRSFE data will be published on a set of 9 CD-ROMs, which will be available for distribution in June 1991. The CDs will contain documentation explaining the overall Experiment, including: documentation for the instruments, the calibration of the instruments, the techniques used in the field, and any documentation available for individual readings or scenes. There will also be complete documentation on the formats of the data files.

The GRSFE data are meant to be used in a variety of investigations, including tests of multispectral radiative transfer models for scattering and emission from planetary surfaces in support of the Earth Observing System (EOS), Mars Observer and Magellan Missions. Studies will also be pursued to establish the neotectonic and paleoclimatic history of the arid southwestern United States. GRSFE data will also be used to support Mars Rover Sample Return (MRSR) simulation studies. Finally, we expect this collection of data to be a useful tool in the teaching of geological remote sensing.

References: Arvidson, Raymond E. and Diane Evans (1989) Geology Remote Sensing Field Experiment. *In GSA 1989 Abstracts With Programs*, p. A121.

TABLE I

GRSFE
DATA INVENTORY OVERVIEW

NUMBER OF SCENES/READINGS
(May be more than one file per set)

INSTRUMENT	CM	DD	DG	KL	LL	LV	MH	PV	SW	TC	UB	Total
AIRSAR	-	-	-	-	5	-	2	-	1	-	3	11
ASAS	-	-	-	-	4	1	-	-	-	-	1	6
AVIRIS	2	-	2	1	-	12	-	3	-	6	2	28
TIMS	1	-	-	1	9	8	-	1	3	2	2	27
DAEDALUS	98	31	41	92	192	-	-	-	-	50	17	521
ELEV PROFILES	-	1	2	-	4	13	3	-	1	1	1	26
HYGROMETER	-	-	-	-	1	-	-	-	-	-	-	1
PARABOLA	-	-	-	-	17	-	-	-	-	-	-	17
PFES	5	-	-	4	22	-	-	-	-	-	-	31
REAGAN RAD	-	-	-	-	2	-	-	-	-	-	-	2
SIRIS	9	-	4	8	24	-	-	-	-	4	7	56
WIND EXP	-	-	-	-	2	-	-	-	-	-	-	2
WEATHER STAT	-	-	-	-	2	-	-	-	-	-	-	2
Total	115	32	49	106	284	34	5	4	5	63	33	730

SIZE OF DATA FILES
(Airborne in MB; Field in KB; .LBL files not included)

INSTRUMENT	CM	DD	DG	KL	LL	LV	MH	PV	SW	TC	UB	Total	
AIRSAR	-	-	-	-	193	-	75	-	39	-	116	423	MB
ASAS	-	-	-	-	760	151	-	-	-	-	176	1087	
AVIRIS	288	-	288	144	-	1729	-	432	-	865	288	4034	
TIMS	9	-	-	19	190	148	-	25	69	51	32	543	
DAEDALUS	301	95	126	283	599	-	-	-	-	154	52	1610	KB
ELEV PROFILES	-	574	1168	-	2293	7654	1804	-	451	603	512	15059	
HYGROMETER	-	-	-	-	2	-	-	-	-	-	-	2	
PARABOLA	-	-	-	-	604	-	-	-	-	-	-	604	
PFES	154	-	-	123	676	-	-	-	-	-	-	953	
REAGAN RAD	-	-	-	-	9	-	-	-	-	-	-	9	
SIRIS	166	-	74	123	24	-	-	-	-	74	129	590	
WIND EXP	-	-	-	-	22	-	-	-	-	-	-	22	
WEATHER STAT	-	-	-	-	___	-	-	-	-	-	-	___	
Total (MB)	298	1	288	163	1147	2036	77	457	108	907	613	6095	MB